A FARMER'S EXPERIENCE WITH DEEP PLOWING OF SOLONETZIC SOILS

NORM FLATEN, WEYBURN

Start fall of 1976 - rental unit from Fred Kellough of Stettler, Alberta - brought here by Levee Farms, Radville.

- Consisted of 6 test strips - approx. 20 acres total.
- Seeded fields including test strips 1977 - near zero production on deep plow sections - somewhat alarming to us - amusing to the neighbors! - too dry for germination!
- Later years demonstrated marked improvement of production on most parts of test strips relative to conventional tillage.

Requirements include -

- power unit of 250 to 300 Engine HP to pull single bottom plow to depth of approx. 24 inches and furrow width of approx. 36 inches.
- bulldozer unit to level plowed terrain for subsequent travel of wheeled tractor pulling various forms of levelling and breakdown of bulky soil structures.
- adequate financing to cover fuel, labor, and equipment costs - perhaps $75 per acre aside from rock removal.
- patience - approx. 2 acres per hour (all going well).
- large supply of acetylene, oxygen, welding rod and reinforcing steel where solid geological specimens present - definitely not for faint hearted entrepreneurs!

Soil types encountered -

- mostly solonetzic Trossachs and Hanley Clays and clay loams.
- some Rouleau Heavy Clay (Gumbo).
- Assessments generally in the range of $2200 to $3800 per quarter section.
- Crop Insurance Soil Classes range L, M, N, O and P.

- Deep plow usage in Sask. appears primarily limited to 2 operators, Roy Levee, Radville and ourselves.
- To date we have plowed approx. 2000 acres since start in 1976 - includes approx. 200 acres done in 1990.
- We have used Kellough subsoilers for 2 years as well with satisfactory but very short term benefits - appears better suited to soils in Radville area.
- An example of difficulties where rock population prevalent -
  - plowed 160 acre field in summer 1983 - 3 substantial failures - broke wheels off once, hitch off another and broke plow in half once - unit is now significantly heavier!
- Personal estimate of success to date on area basis on <u>our</u> farm is 70% good, 20% neutral and 10% bad news!

Advantages where adapted to soils in our experience include -

1. Improved permeability re - rainfall and snowmelt.
2. Soil structure more readily tilled by light and medium duty equipment.
3. Topsoil protected to some extent from wind erosion.
4. Chemical and tillage weed control more adequate.
5. Grain yields significantly higher if reasonable moisture present.
6. Reduced problems with stones and rocks after initial heavy duty removal.

Disadvantages include -

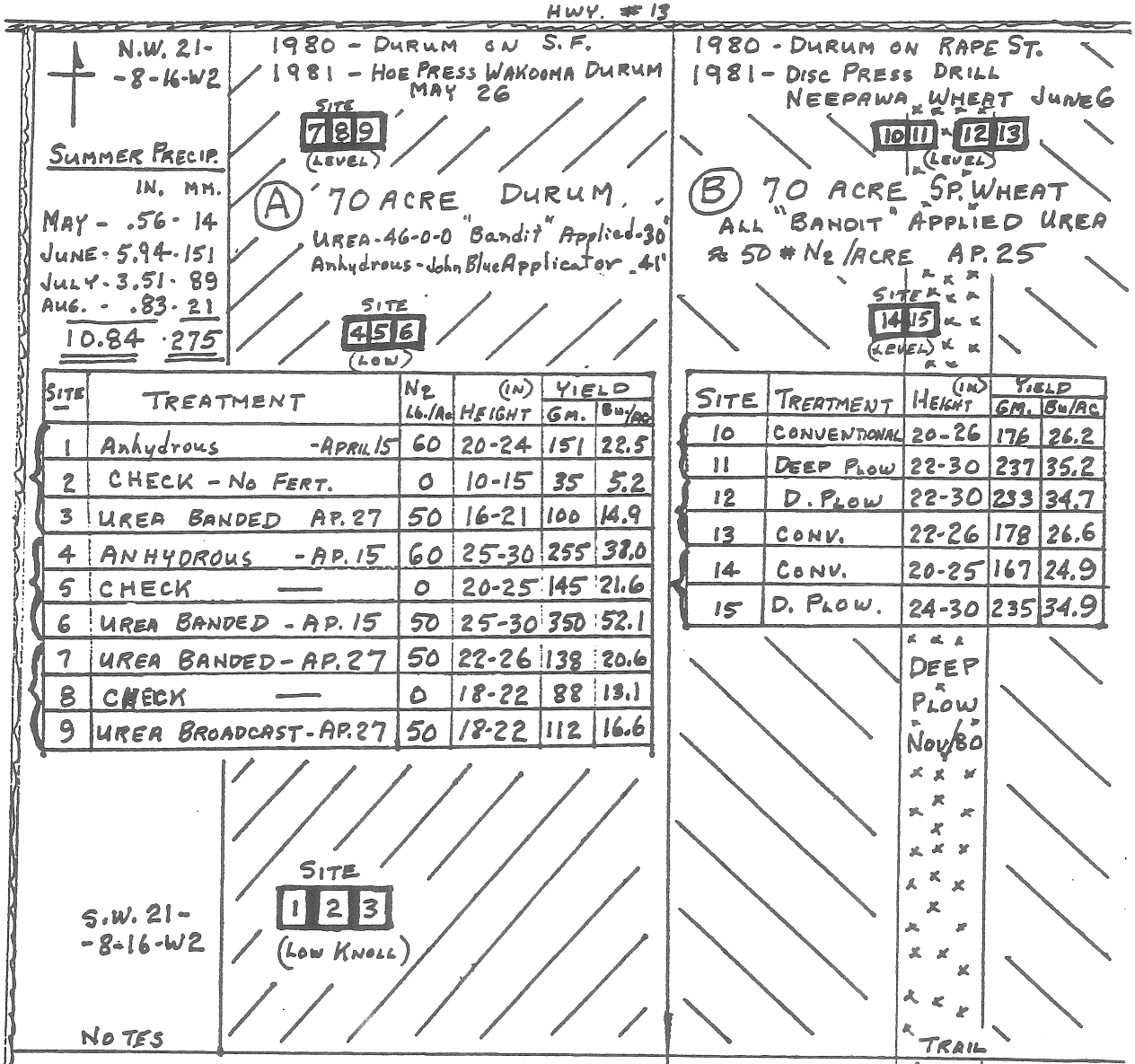
1. High cost of equipment, power, workdown, labor and maintenance.
2. Seedbed may be too loose, dry and/or salinized for crop production for 1st year or more after plowing.
3. Saline areas may become even worse problem after plowing.
4. Telephone companies frown on severance of underground cables.

CONCLUSION -BENEFITS OUTWAY LIMITATIONS ON OUR FARM
-SHOULD HAVE BEEN MORE AGRESSIVE IN EARLIER YEARS!

NITROGEN FERTILIZER & DEEP PLOW YIELD TRIALS 1981

NORM FLATEN BOX 1076 WEYBURN S4H 2L3

ONE SQUARE METER SAMPLES PROCESSED BY SASK. WHEAT POOL DEVELOPMENT FARM c/o GORDON HULTGREEN, WATROUS.



SUMMER PRECIP.

	IN.	MM.
MAY -	.56	14
JUNE -	5.94	151
JULY -	3.51	89
AUG. -	.83	21
	10.84	275

SITE	TREATMENT	N2 LB./AC.	HEIGHT (IN)	YIELD GM.	YIELD BU/AC
1	Anhydrous -APRIL 15	60	20-24	151	22.5
2	CHECK - No FERT.	0	10-15	35	5.2
3	UREA BANDED AP. 27	50	16-21	100	14.9
4	ANHYDROUS -AP. 15	60	25-30	255	38.0
5	CHECK —	0	20-25	145	21.6
6	UREA BANDED - AP. 15	50	25-30	350	52.1
7	UREA BANDED - AP. 27	50	22-26	138	20.6
8	CHECK —	0	18-22	88	13.1
9	UREA BROADCAST - AP. 27	50	18-22	112	16.6

SITE	TREATMENT	HEIGHT (IN)	YIELD GM.	YIELD BU/AC
10	CONVENTIONAL	20-26	176	26.2
11	DEEP PLOW	22-30	237	35.2
12	D. PLOW	22-30	233	34.7
13	CONV.	22-26	178	26.6
14	CONV.	20-25	167	24.9
15	D. PLOW.	24-30	235	34.9

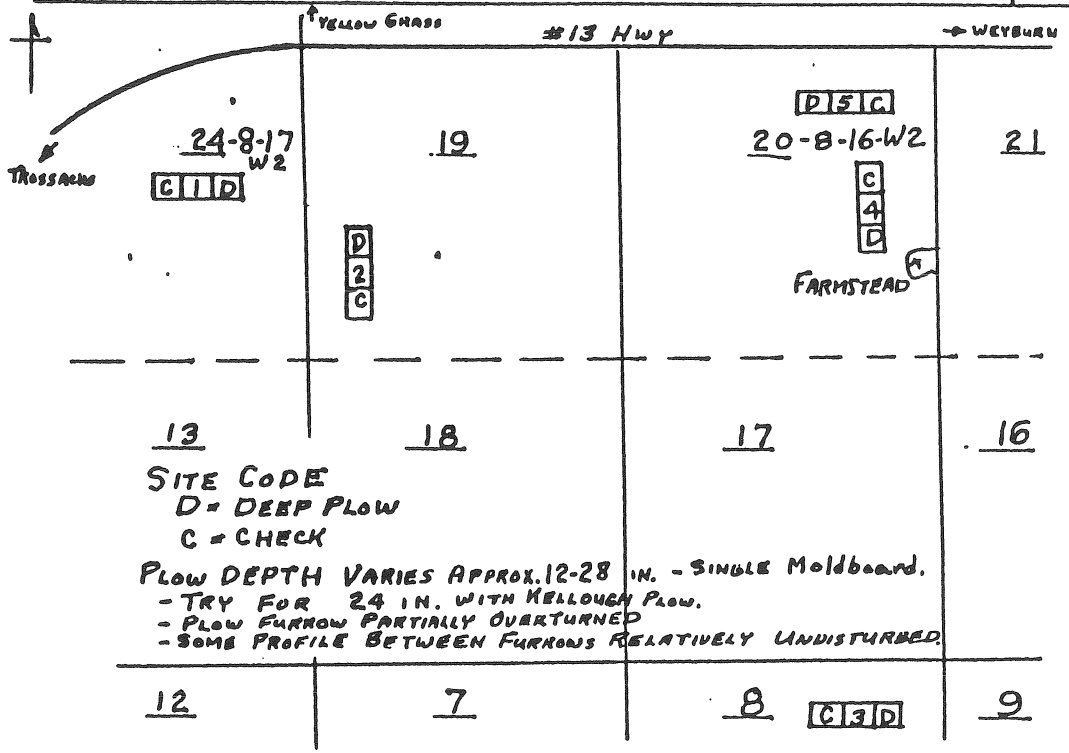
① VERY HEAVY PRECIP. IN JUNE & JULY A GREAT BOOST TO ALL TREATMENTS

② DEEP PLOW RESPONSE UNUSUAL IN FIRST YEAR - RELATE TO SOIL TYPE, RAINFALL AMOUNTS & TIMING, DATE OF SEEDING & SOME GOOD LUCK
2 OTHER 1980 DEEP PLOW PROJECT FIELDS SHOWED MORE CHARACTERISTIC DEPRESSION OF WHEAT YIELD IN 1981 - FIRST YEAR AFTER MAJOR OPERATION.
COST OF DEEP PLOW PLUS WORKDOWN ≈ $50/AC. IN ABOVE FIELD

③ 1981 RESPONSE OF RAPE CROP ON SOUTH END OF SAME FIELD VERY FAVOURABLE BUT NOT SAMPLED.

④ SAMPLES FROM SITES 4 and 6 May have been mixed

DEEP PLOW YIELD TRIALS-1983 - NORM FLATEN, BOX 1076, WEYBURN, S4H 2L3



SITE CODE
D = DEEP PLOW
C = CHECK

PLOW DEPTH VARIES APPROX. 12-28 IN. - SINGLE MOLDBOARD.
- TRY FOR 24 IN. WITH KELLOUGH PLOW.
- PLOW FURROW PARTIALLY OVERTURNED
- SOME PROFILE BETWEEN FURROWS RELATIVELY UNDISTURBED.

CROP '83	LAND USE '80	'81	'82	IMP SAMPLE	APPROX. HT. CM.	IN.	SAMPLE WT. gm	YIELD Kg/ha	Bu/Ac.	YEAR DEEP PLOWED
WHEAT	DUR	DUR	DUR	C1	45-55	18-22	85	850	12.6	—
				D1	55-70	22-28	93	930	13.8	1976
WHEAT	SF	FALL RYE	WHT.	C2	40-55	16-22	88	880	13.0	—
				D2	60-75	24-30	144	1440	21.3	1976
WHEAT	FALL RYE	WHT.	WHT.	C3	40-50	16-20	76	760	11.2	—
				D3	50-65	20-26	128	1280	18.9	1980
DURUM	DUR.	DUR.	S.F.	C4	40-60	16-24	115	1150	17.0	—
				D4	60-77	24-31	156	1560	23.1	1982
DURUM	DUR.	DUR.	BLY.	C5	40-53	16-22	27	270	4.0	—
				D5	53-72	22-29	172	1720	25.5	1981

- Sq. Meter Samples collected late August + Early Sept.
- Samples threshed and weighed by University of Sask. Soils Dept. - Thanks!

- Summer Precip.

	in.	mm	
May	1.86	47	
June	1.93	48	
July	3.03	76	Very Hot + Windy
August	.81	20	
	7.63	191	

Other Notes

① - Samples taken from areas of favorable response - Some sites with severe Salt Deposits show negative response - esp. short term.

② - Approx. 975 Acres plowed from 1976 - 1983 on this farm.

③ - Yields often depressed for 1 or 2 yrs. after plowing - then show fairly substained increase.

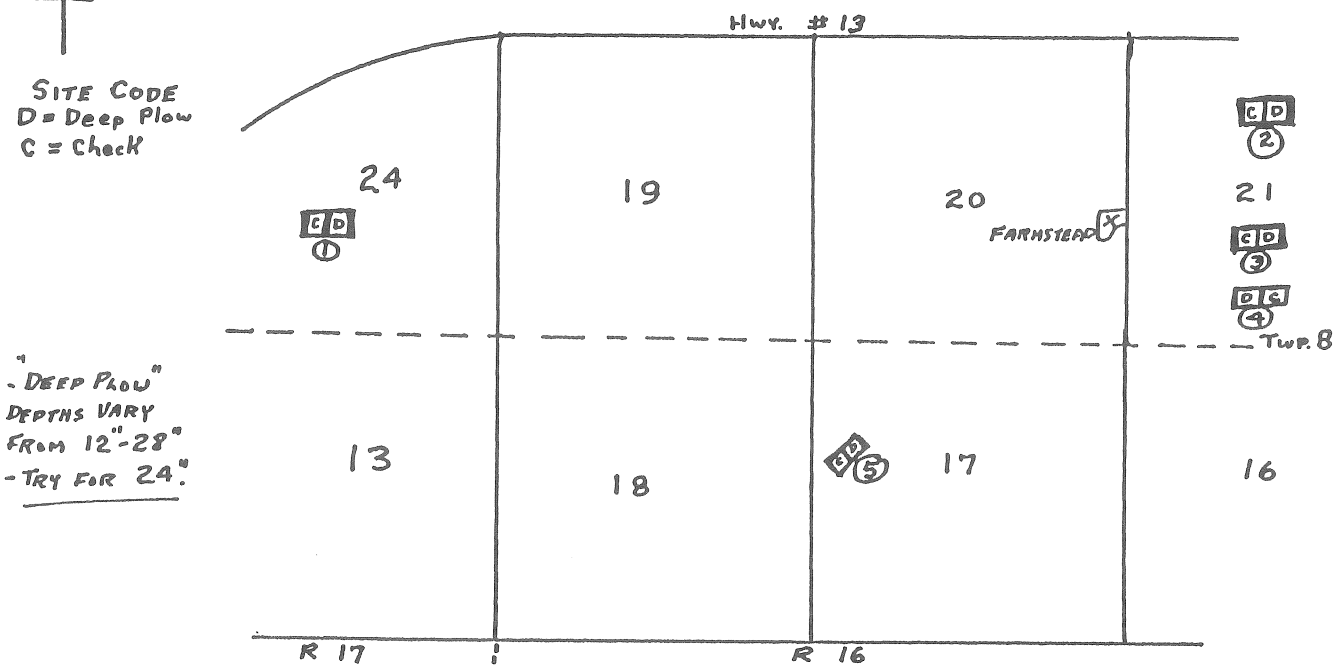
④ - Process includes plowing w/ 275 Eng. Hp. Tractor (barely adequate!), Bulldoze and Heavy Tandem Disc, and Cultivate Level numerous times.

⑤ Cost estimated @ $60 per Acre - appears recoverable in 3-4 Years.

⑥ Wet areas of deep plowed land require equipment operator to turn off radio for discrete observance of possible dramatic elevation change with total loss of tractive capability.

⑦ Rocky ground = Bad news re plow.

DEEP PLOW YIELD TRIALS - 1982 - NORM FLATEN, BOX 1076, WEYBURN, SK. S4H 2L3



Square Meter Samples Collected by Norm Flaten & Brent Flaten Sept. 19/82

Samples threshed + Weighed by Univ. of Sask. Soils Dept. - Thanks!

Summer Precip.

	in.	mm.
May -	2.2	55
June -	0.6	16
July -	3.4	89
Aug. -	1.4	36
	7.6	196

Site	Crop '82	Land Use '79	'80	'81	1 M.² Sample	Approx. Ht. IN.	CM.	Sample Wt.-Gm.	Yield Kg/Ha.	Bu/Ac.	Year Deep Plowed
1	Durum	Barley	Fall Rye	Wheat	C 1	16-24	40-60	93	930	14	
					D 1	24-30	60-75	160	1600	24	1976
2	Wheat	Rape	Durum	Wheat	C 2	16-24	40-60	147	1470	22	
					D 2	24-32	60-80	194	1940	29	1980
3	Wheat	Rape	S.F.	Rape	C 3	24-32	60-80	181	1810	27	
					D 3	30-40	75-100	306	3060	46	1980
4	Wheat	Rape	S.F.	Rape	C 4	13-20	32-50	137	1370	21	
					D 4	24-30	60-75	240	2400	36	1980
5	Durum	Durum	S.F.	Durum	C 5	20-28	50-70	140	1400	21	
					D 5	30-38	75-95	244	2440	37	1980

NOTES

① - Samples taken from areas of favorable response - Some areas of severe salt deposits show zero or negative response to deep plow - esp. in short term.

② Approx. 20 plots varying from 1 acre to 100 acres plowed since 1976.

③ Yields usually depressed for 1 or 2 yrs. after plowing - then show fairly substained increase.

④ Relate yield increase to larger plant population, more tillers, larger heads & more plump kernels

⑤ Cost of plowing + workdown $50/Ac